

Application No. 10/804,833
Amendment under 37 C.F.R. §1.312 dated January 17, 2006
Reply to Notice of Allowance of January 5, 2006

Listing of Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-14 (canceled)

15.(previously presented) A method of quilting a substrate with a multi-needle quilting machine having at least two rows of stitching elements comprising:
with stitching elements of each of the at least two rows activated, stitching a first pattern with the rows of stitching elements while imparting relative longitudinal movement in a net forward direction between the stitching elements and the substrate; then
deactivating a first row of the stitching elements at a first set of final longitudinal positions on the substrate; then,
with the stitching elements of the first row deactivated, further stitching the first pattern with a second row of the stitching elements while imparting additional relative longitudinal movement of a first given longitudinal distance in a net forward direction between the stitching elements and the substrate; then
deactivating the second row of the stitching elements at a second set of final longitudinal positions on the substrate having a predetermined relationship to the first set of final longitudinal positions; then,
maintaining the stitching elements of the first row at a first set of starting longitudinal positions; then
activating the first row of the stitching elements at the first set of starting longitudinal positions on the substrate; then,
with the stitching elements of the first row activated, stitching a second pattern with the first row of the stitching elements while imparting additional relative longitudinal movement a second given distance in a net forward direction between the stitching elements and the substrate; then
activating the second row of the stitching elements at a second set of starting longitudinal positions on the substrate having a predetermined relationship to the first set of starting longitudinal positions; then,

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with stitching elements of the first and second rows activated, further stitching the second pattern with the rows of stitching elements while imparting relative longitudinal movement in a net forward direction between the stitching elements and the substrate;

whereby, the first and second final longitudinal positions of the first pattern are less than the first given longitudinal distance apart and the first and second starting longitudinal positions of the second pattern are less than the second given longitudinal distance apart.

16.(original) A method of quilting a substrate with a multi-needle quilting machine having at least two rows of stitching elements comprising:

with stitching elements of the at least two rows activated, stitching a first pattern with the rows of stitching elements while imparting relative longitudinal movement in a net forward direction between the stitching elements and the substrate; then deactivating a first row of the stitching elements at a first set of final longitudinal positions on the substrate; then,

with the stitching elements of the first row deactivated, further stitching the first pattern with a second row of the stitching elements while imparting additional relative longitudinal movement a first given longitudinal distance in a net forward direction between the stitching elements and the substrate; then deactivating the second row of the stitching elements at a second set of final longitudinal positions on the substrate having a predetermined relationship to the first set of final longitudinal positions; then,

with the stitching elements of the first and second rows deactivated, imparting relative longitudinal movement in a net backward direction between the stitching elements and the substrate until the stitching elements of the first row are at a first set of starting longitudinal positions less than the given longitudinal distance from the final longitudinal positions of the first set; then

activating the first row of the stitching elements at the first set of starting longitudinal positions on the substrate; then,

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with the stitching elements of the first row activated, stitching a second pattern with the first row of the stitching elements while imparting additional relative longitudinal movement a second given distance in a net forward direction between the stitching elements and the substrate; then
activating the second row of the stitching elements at a second set of starting longitudinal positions on the substrate having a predetermined relationship to the first set of starting longitudinal positions; then,
with stitching elements of the first and second rows activated, further stitching the second pattern with the rows of stitching elements while imparting relative longitudinal movement in a net forward direction between the stitching elements and the substrate;
whereby, the first and second patterns are stitched on the substrate less than the given distance apart.

17.(previously presented) The method of claim 16 further comprising:
sewing a series of tack stitches with stitching elements of a row when deactivating the stitching elements thereof.

18.(original) The method of claim 16 further comprising:
providing a first bridge having the first row of stitching elements thereon and a second bridge having the second row of stitching elements thereon, each of the bridges being separately moveable relative to a frame and relative to each other;
the stitching of the first pattern with the rows of stitching elements being carried out with the bridges stationary and while imparting relative longitudinal movement in a net forward direction of the substrate relative to the frame;
the further stitching of the first pattern with the second row of the stitching elements is carried out with the substrate stationary and while imparting the additional relative longitudinal movement by moving the bridges in a net backward direction relative to the frame;

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the imparting of relative longitudinal movement in a net backward direction is carried out with the substrate stationary and moving the bridges in a net forward direction relative to the frame;

the stitching of the second pattern with the first row of the stitching elements is carried out with the bridges stationary and imparting additional relative longitudinal movement of the substrate in a net forward direction relative to the frame; and

the further stitching of the second pattern with the rows of stitching elements is carried out with the bridges stationary and imparting relative longitudinal movement in a net forward direction of the substrate relative to the frame.

Claims 19-21 (canceled)

22.(previously presented) A method of quilting a substrate with a multi-needle quilting machine having at least two separately actuatable groups of stitching elements, the at least two groups including a first group and a second group that each include a plurality of stitching elements, the method comprising:

with stitching elements of each of the at least two groups activated, quilting a first pattern on a substrate by stitching a first series of stitches of the first pattern with a plurality of the stitching elements of the first group while stitching a second series of stitches of the first pattern with a plurality of the stitching elements of the second group; then

deactivating the stitching elements of the first group and further stitching a second series of stitches of the first pattern with a plurality of the stitching elements of the second group; then,

deactivating the stitching elements of the second group to complete the quilting of the first pattern on the substrate;

and

after deactivating the stitching elements of the first group, activating stitching elements of the first group and beginning quilting a second pattern on the substrate by stitching

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a first series of stitches of a second pattern with the plurality of the elements of the first group; then
after the deactivating of the stitching elements of the second group to complete the quilting of the first pattern on the substrate, and after the activating of the stitching elements of the first group and the beginning of the quilting of the second pattern on the substrate, activating stitching elements of the second group and further quilting of the second pattern on a substrate by stitching a second series of stitches of the second pattern with the plurality of the stitching elements of the second group.

23.(previously presented) The method of claim 22 wherein:
the beginning of the quilting of a second pattern on the substrate occurs before the deactivating of the stitching elements of the second group.

24.(previously presented) The method of claim 22 wherein:
the beginning of the quilting of a second pattern on the substrate is carried out after the deactivating of the stitching elements of the second group.

25.(previously presented) The method of claim 24 wherein:
the deactivating of the stitching elements of each of the first and second groups includes sewing tack stitch sequences with stitching elements of the respective groups and then cutting at least a top thread extending therefrom.

26.(previously presented) The method of claim 24 wherein:
the quilting of the first and second patterns includes imparting a net forward longitudinal motion to the substrate relative to each of the first and second groups of stitching elements; and
when the stitching elements of both the first and second groups are deactivated, imparting a net reverse longitudinal motion to the substrate relative to the stitching elements of at least one of the groups.

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27.(previously presented) The method of claim 26 further comprising:
maintaining a fixed longitudinal spacing between the stitching elements of the first group and the stitching elements of the second group.

28.(previously presented) The method of claim 27 further comprising:
quilting the first and second patterns at a longitudinal distance apart that is less than the fixed longitudinal spacing between the stitching elements of the different groups;
the net reverse longitudinal motion being less than the fixed longitudinal spacing.

29.(previously presented) The method of claim 28 wherein:
the net reverse longitudinal motion is less than the fixed longitudinal spacing by the amount of the longitudinal distance by which the patterns are to be spaced apart.

30.(currently amended) The method of claim 26 wherein:
the groups of stitching elements are mounted on one or more transverse bridges that are longitudinally moveable relative to the frame of a quilting machine;
the ~~impacting a~~ impacting of a net forward longitudinal motion to the substrate relative to each of the first and second groups of stitching elements at least partially includes advancing the substrate in a downstream direction relative to the frame of the quilting machine;
and
the imparting of the net reverse longitudinal motion to the substrate relative to the stitching elements of at least one of the groups includes moving a bridge on which the group of stitching elements is mounted in the downstream direction relative to the frame of the quilting machine.

31.(currently amended) The method of claim 30 wherein:
the ~~impacting a~~ impacting of a net forward longitudinal motion to the substrate relative to each of the first and second groups of stitching elements during the quilting of the second pattern includes moving the bridge on which the group of stitching elements is mounted in the upstream direction relative to the frame of the quilting machine.

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32.(previously presented) The method of claim 26 further comprising:

maintaining the groups of stitching elements on first and second bridges that are separately longitudinally moveable and moveable relative to each other between a minimum longitudinal spacing and a maximum longitudinal spacing.

33.(previously presented) The method of claim 32 further comprising:

quilting the first and second patterns at a longitudinal distance apart that is less than the minimum longitudinal spacing;
the net reverse longitudinal motion being less than the minimum longitudinal spacing.

34.(previously presented) The method of claim 33 wherein:

the net reverse longitudinal motion is less than the minimum longitudinal spacing by the amount of the longitudinal distance by which the patterns are to be spaced apart.

35.(previously presented) The method of claim 24 wherein:

the deactivation of at least some of the stitching elements of the second group takes place
in approximate transverse alignment with positions on the substrate at which the deactivation of at least some of the stitching elements of the first group took place; and
the activation of at least some of the stitching elements of the second group takes place
in approximate transverse alignment with positions on the substrate at which the activation of at least some of the stitching elements of the first group took place.

Claims 36-37 (canceled)

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38.(previously presented) The quilting machine of claim 42 further comprising:
a frame;
at least two bridge assemblies moveable relative to the frame, and each having
mounted thereon one of the groups of the stitching elements.

39.(previously presented) The quilting machine of claim 42 wherein:
the two groups of stitching elements are each separately moveable longitudinally
relative to each other.

40.(currently amended) The quilting machine of claim 39 wherein:
the material drive is operable to feed the substrate [[in]] vertically in a vertical
plane;
the two groups of stitching elements are moveable vertically;
the stitching elements each include a needle oriented horizontally perpendicular to
the vertical plane; and
the stitching elements of the plurality include stitching elements selectively
operable relative to others of the stitching elements.

41.(currently amended) The quilting machine of claim 42 wherein:
the material drive is operable to feed the substrate [[in]] vertically in a vertical
plane;
the at least one group of stitching elements is moveable vertically [[relative]]; and
the stitching elements each include a needle oriented horizontally perpendicular to
the vertical plane.

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42.(currently amended) A multi-needle quilting machine comprising:

at least two separately actuatable groups of stitching elements, the at least two groups including a first group and a second group that each include a plurality of stitching elements longitudinally spaced from stitching elements of the other group;

a material drive selectively operable to impart relative longitudinal movement between a substrate and the groups of stitching elements;

a transverse drive operable to impart relative transverse movement between the substrate and the groups of stitching elements;

a stitching element drive operable to either sew with the first group without sewing with the second group, or to sew with the second group without sewing with the first group, or to sew simultaneously with both;

a controller operable to control the operation of the material drive, the transverse drive, and the stitching element drive to stitch a selected pattern as the substrate by sewing with both groups of stitching elements simultaneously or by selectively sewing with stitching elements of one group while without sewing with stitching elements of the other group;

the controller being programmed to quilt a pattern on a substrate with stitching elements of each of the at least two groups sewing simultaneously, by stitching first series of stitches of the pattern with a plurality of the stitching elements of the first group while stitching second series of stitches of the pattern with a plurality of the stitching elements of the second group a longitudinal distance from the stitching of the first series of stitches; and,

the controller being further ~~programmed-stitch~~ programmed to stitch a second series of stitches of the pattern with a plurality of the stitching elements of the second group without sewing with stitching elements of the first group and to thereby begin or end the stitching of the first and second series of stitches closer together than said longitudinal distance.

43.(previously presented) The quilting machine of claim 42 wherein:

the material drive is operable to reverse the longitudinal direction of the movement of the substrate relative to the stitching elements; and

the controller is programmed to sew with stitching elements of both groups simultaneously while moving the substrate in a forward longitudinal direction relative to the

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stitching elements and to sew with the stitching elements of the second group in a reverse longitudinal direction relative to the stitching elements to begin or end the stitching.

44.(previously presented) The quilting machine of claim 42 further comprising:
a frame;
at least two bridge assemblies moveable relative to the frame, and each having mounted thereon one of the groups of the stitching elements;
the two bridge assemblies are each being separately moveable longitudinally relative to the frame and to each other.

45.(previously presented) The quilting machine of claim 44 wherein:
the controller is programmed to sew with stitching elements of both groups simultaneously while moving at least one bridge in one longitudinal direction relative to the frame and to sew with the stitching elements of the second group while moving at least one bridge in the opposite longitudinal direction relative to the frame to begin or end the stitching.

46.(currently amended) The quilting machine of claim 44 wherein:
the material drive is operable to feed the substrate in vertically ~~[[in]]~~ a vertical plane relative to the frame;
the two bridge assemblies being moveable vertically relative to the frame;
the stitching elements each include a needle oriented horizontally perpendicular to the vertical plane;
the stitching elements of the plurality include stitching elements selectively operable relative to others of the stitching elements; and
the stitching elements each include a needle oriented horizontally perpendicular to the vertical plane.